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Claims:

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ART 34 AMDT

1. A perimeter security system including;

at least a first waveguide buried below ground level and extending along a perimeter which defines an area to be monitored;

means for launching light into the first waveguide; and

a detector for detecting light which has propagated through the waveguide so as to detect a change in a parameter of the light propagating through the waveguide due to an intrusion across the ground beneath which the waveguide is buried and for providing an indication of that intrusion.

2. The perimeter security system of claim 1 wherein at least a second waveguide is also provided, and the means for launching the light, launches the light into both the first and second waveguides;

coupling means for coupling the first and second waveguides together so that light propagating through the first and second waveguides is caused to interfere to create an interference pattern; and

wherein the detector detects the interference pattern and upon an intrusion a parameter of light passing through one of the waveguides is altered with respect to the same parameter of the light passing through the other of the waveguides, to thereby change the interference pattern detected by the detector to provide an indication of the intrusion.

3. The perimeter security system of claim 2 wherein the first and second waveguides are provided in at least one cable.

4. The perimeter security system of claim 2 wherein the first and second waveguides are provided in separate

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cables and the separate cables are buried beneath ground level in zig-zag spaced apart relationship with respect to one another to define a perimeter region having a substantial width which will be traversed by a person intruding into the area.

5. The perimeter security system of claim 4 wherein the substantial width is a width such that a person travelling in normal walking or running motion will not step over the width of the region.

6. The perimeter security system of claim 5 wherein the width of the region is between one and two meters.

7. The perimeter security system of claim 2 wherein counter-propagating light signals are launched into each of the waveguides so that the location of an intrusion can be detected by the time difference between detection of the changed interference pattern propagating in one direction and to the changed interference pattern propagating in the opposite direction.

8. The perimeter security system of claim 4 wherein a first of the said cables contains said at least one waveguide and a second said cable contains said second waveguide;

a further waveguide being contained within the first cable;

first coupling means at one end of the said first, second and further waveguides for coupling the waveguides so that light launched into the said further waveguide is able to propagate through the further waveguide and then into the said first and said second waveguides to propagate in a first direction through the said first and second waveguides;

second coupling means at the other end of said first and said second waveguides so that the light

propagating in the said first direction through said first and second waveguides is able to coherently recombine and interfere at the second coupling means; and

light also being able to be launched through said second coupling means and into said first and second waveguides to travel in a direction opposite said first direction and coherently recombine at the first coupling means so the light travelling in the opposite direction is able to interfere and then propagate through the said further waveguide.

9. The perimeter security system of claim 8 wherein the detector is coupled to the further waveguide and to the second coupling means for detecting the counter propagating light signals after interference of those signals so that any disturbance of the first waveguide and/or said second waveguide will change a parameter of the light propagating through the first and/or second waveguides to thereby change the interference patterns detected by the detector to cause the detector to provide an indication of the intrusion.

10. The perimeter security system of claim 9 wherein the location of the intrusion can be determined by the time difference between receipt of the modified counter-propagating signal travelling in the first direction compared to the receipt of the modified propagating signal travelling in the opposite direction.

11. The perimeter security system of claim 9 wherein the detector comprises a first detector and a second detector, the first detector and second detector being synchronised and the first detector detecting the counter-propagating signal travelling in the first direction and the second detector detecting the counter-propagating signal travelling in the opposite direction.

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12. The perimeter security system of claim 8 wherein the means for launching light into the waveguides comprises a light source coupled to a third coupling means having first and second output arms, the first output arm being coupled to an input arm of a fourth coupling means and the other output arm being coupled to an arm of a fifth coupling means, an arm of the fourth coupling means being coupled to the further waveguide for launching light into the further waveguide, and an arm of the fifth coupling means being coupled to an arm of the second coupling means for launching light into the second coupling means.

13. The perimeter security system of claim 11 wherein the first detector is coupled to an output arm of the fourth coupling means and the second detector is connected to an output arm of the fifth coupling means.

14. A method of monitoring a perimeter, including;

providing a first waveguide below ground level along the perimeter to be monitored;

causing a light signal to propagate through the waveguide; and

detecting a change in parameter of the light signal to indicate an intrusion across the perimeter.

15. The method of claim 14 wherein a second waveguide is provided and the light signal is launched into the first and second waveguides;

the method including causing the light signal in the first waveguide and the second waveguide to combine and interfere; and

the detecting step comprising detecting the interference pattern so that a change in interference pattern indicates in intrusion across the perimeter.

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16. The method of claim 14 wherein the method further includes;

causing counter-propagating light signals to propagate through the first and second waveguides, detecting modified counter-propagating signals caused by a change in parameter of the signals due to an intrusion across the perimeter and determining the location of the intrusion by measuring the time difference between receipt of a modified counter-propagating signal travelling in a first direction compared to receipt of a modified counter-propagating signal travelling in the opposite direction.